

PATENT ABSTRACTS OF JAPAN

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KOYADA MINORU**(54) INVISIBLE FLUORESCENT INK AND CODING DEVICE USING THE SAME INK****(57)Abstract:**

PROBLEM TO BE SOLVED: To obtain the subject ink capable of readily visually observing printed result and making the printed result invisible or slightly visible by subjecting the printed material to decoloring treatment.

SOLUTION: A material which is invisible or slightly visible when dissolved in cyanine dye, is used as a fluorescent material used for fluorescent ink. The fluorescent ink is mixed with a decolorizer such as cyanine dye which decolors when a specific wavelength is irradiated to the fluorescent ink. In this case, a cyanine dye exhibiting absorption at a wavelength longer than that excited with cyanine dye of the fluorescent material is used as the decolorizer.

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[Claim(s)]

[Claim 1] Invisible fluorescence ink characterized by changing wavelength which contains a decolorization material which can be decolorized by irradiating under the light a fluorescence material which cannot appear easily and specific wavelength which cannot be viewed when it dissolves into a solution, and excites said fluorescence material, and wavelength which decolorizes said decolorization material.

[Claim 2] Wavelength which decolorizes a decolorization material is invisible fluorescence ink according to claim 1 characterized by ***** rather than wavelength which excites a fluorescence material.

[Claim 3] A means to input or read information, such as a numeric character and an alphabetic character, and a means to change information inputted or read by this means into a mark in which machine read is possible, A printing means to print in mail etc. a mark which was changed with this means and in which machine read is possible using fluorescence ink is established. Said fluorescence ink That viewing is impossible under a decolorization material which consists of coloring matter which absorbs and decolorizes specific wavelength, and the light, or coding equipment characterized by being ink which mixed a fluorescence material which consists of a fluorochrome which will generate light of another wavelength if it is hard to be visible and specific wavelength is irradiated.

[Claim 4] Coding equipment according to claim 3 characterized by using coloring matter which will emit light in the light if cyanine dye is used as coloring matter to decolorize and ultraviolet rays are irradiated as a fluorochrome.

[Claim 5] Coding equipment according to claim 4 characterized by making concentration of cyanine dye into less than [0.05wt%].

[Claim 6] A means to input or read information, such as a numeric character and an alphabetic character, and a means to change information inputted or read by this means into a mark in which machine read is possible, A printing means to print in mail etc. a mark which was changed with this means and in which machine read is possible using fluorescence ink, A mark reading means to read a mark which was printed from

this printing means and in which machine read is possible, A partition means to classify said mail etc. based on a read result of a mark by this mark reading means, A decolorization means to irradiate specific wavelength at the mark printing sections, such as said mail, is established after mark read by said mark reading means. Said fluorescence ink That viewing is impossible under a decolorization material which consists of coloring matter which absorbs and decolorizes specific wavelength of said decolorization means, and the light, or coding equipment characterized by being ink which mixed a fluorescence material which consists of a fluorochrome which will generate light of another wavelength if it is hard to be visible and specific wavelength is irradiated.

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to that viewing is impossible or the coding equipment which prints in mail etc. the mark in which machine read, such as a bar code, is possible using the invisible fluorescence ink which cannot appear easily, and this fluorescence ink.

[0002]

[Description of the Prior Art] For example, in order to give security, fluorescence ink is used as ink, and the thing which irradiates the excitation light of that fluorescence ink at the place printed in this fluorescence ink, and enabled it to detect fluorescence ink is known. Whether viewing indicated by JP,54-22336,B and JP,8-239607,A as ink used in order to raise security furthermore being impossible, and the invisible fluorescence ink which cannot appear easily are known.

[0003] The method of considering as the method of carrying out the automatic partition of the mail on the other hand, and reading the bar code corresponding to the address information which printed the zip code and the address which were given to mail using direct printing or a label in the method of reading by OCR and carrying out an automatic partition or mail etc., and carrying out an automatic partition is learned. Coding equipment is known as equipment which prints a bar code etc. in mail.

[0004] Coding equipment sticks the label which changed this information into the bar code in inputting address information by key input, and printed this bar code directly in mail, or printed the bar code, or works so that JP,61-15758,B may also see. For example, this key input information is changed into a bar code, and this bar code is directly printed in mail with an airline printer because an operator keys the zip code given to mail. Or what was printed on the label with the airline printer is stuck on mail. In this way, a bar code is read in the mail which printed the bar code directly or indirectly using

a reader, and the automatic partition of the mail is carried out for every address.

[0005] With such coding equipment, when printing a bar code in mail, fluorescence ink is often used from relation, such as a substrate of mail, and an alphabetic character. That is, a bar code can be read, without seldom being influenced of the substrate and alphabetic character under the bar code printed by irradiating excitation light in fluorescence ink. Since problems, such as soiling an alphabetic character, will arise if a bar code is especially printed on the destination address by mail, whether viewing which was mentioned above being impossible, and the invisible fluorescence ink which cannot appear easily are used.

[0006] By the way, to print address information by the bar code in mail, in order to avoid duplex printing of a bar code, it is necessary to check whether the bar code is already printed. That is, when the bar code is printed to the duplex, distinguishing becomes impossible at the time of bar code read, and it will reject mail. However, since the check by viewing cannot be performed when a bar code is printed using invisible fluorescence ink, the method of checking using the reader of the dedication which can read invisible fluorescence ink, or irradiating excitation light at invisible fluorescence ink, making the light emit light, and viewing must be taken.

[0007]

[Problem(s) to be Solved by the Invention] Thus, since the check by viewing becomes difficult when marks, such as a bar code, are conventionally printed in mail etc. using invisible fluorescence ink, Specific invisible fluorescence ink which irradiates the excitation light of specification [**** / reading with the reader of dedication and checking], and emits light in the light is used. The large-scale equipment for the check of a mark, such as irradiating excitation light and checking it in this fluorescence ink, using excitation light irradiation equipment, had to be used, and there were problems, like a check becomes troublesome.

[0008] Invention claim 1 and given in two can view the printed result easily, and offers that viewing of a printing result is impossible or the invisible fluorescence ink which it can be made hard to be visible by performing decolorization processing after that.

[0009] Invention according to claim 3 to 6 can view the printed result easily, and offers that viewing of a printing result is impossible or the coding equipment which can perform easily the check of whether the mark in which machine read is possible can be printed in mail etc. using the invisible fluorescence ink which it can be made hard to be visible, and the mark is printed by mail etc. by this by performing decolorization processing after that.

[0010] Moreover, invention according to claim 6 decolorizes further the fluorescence ink used for printing, and offers invisible or the coding equipment which reads the mark

which could make it hard to be visible and was printed, can carry out the automatic partition of the mail etc., and can improve workability.

[0011]

[Means for Solving the Problem] Invention according to claim 1 contains a decolorization material which can be decolorized by irradiating under the light a fluorescence material which cannot appear easily and specific wavelength which cannot be viewed, when it dissolves into a solution, and it is in invisible fluorescence ink which changed wavelength which excites a fluorescence material, and wavelength which decolorizes a decolorization material.

[0012] Invention according to claim 2 makes wavelength which decolorizes a decolorization material longer than wavelength which excites a fluorescence material in invisible fluorescence ink according to claim 1.

[0013] A means by which invention according to claim 3 inputs or reads information, such as a numeric character and an alphabetic character, A means to change information inputted or read by this means into a mark in which machine read is possible, A printing means to print in mail etc. a mark which was changed with this means and in which machine read is possible using fluorescence ink is established. As fluorescence ink It is in that viewing is impossible or coding equipment which used ink which mixed a fluorescence material which consists of a fluorochrome which will generate light of another wavelength if it is hard to be visible and specific wavelength is irradiated under a decolorization material which consists of coloring matter which absorbs and decolorizes specific wavelength, and the light.

[0014] In coding equipment according to claim 3, if invention according to claim 4 uses cyanine dye as coloring matter to decolorize and ultraviolet rays are irradiated as a fluorochrome, it will use coloring matter which emits light in the light.

[0015] Invention according to claim 5 makes concentration of cyanine dye less than [0.05wt%] in coding equipment according to claim 4.

[0016] A means by which invention according to claim 6 inputs or reads information, such as a numeric character and an alphabetic character, A means to change information inputted or read by this means into a mark in which machine read is possible, A printing means to print in mail etc. a mark which was changed with this means and in which machine read is possible using fluorescence ink, A mark reading means to read a mark which was printed from this printing means and in which machine read is possible, A partition means to classify mail etc. based on a read result of a mark by this mark reading means, A decolorization means to irradiate specific wavelength at the mark printing sections, such as mail, is established after mark read by mark reading means. As fluorescence ink It is in that viewing is impossible or coding

equipment which used ink which mixed a fluorescence material which consists of a fluorochrome which will generate light of another wavelength if it is hard to be visible and specific wavelength is irradiated under a decolorization material which consists of coloring matter which absorbs and decolorizes specific wavelength of a decolorization means, and the light.

[0017]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing. Drawing 1 is the external view showing the whole coding equipment configuration, and this coding equipment consists of a conservation stacker 2 and the partition stacker section 3 the input control unit 1 and temporarily, lays mail 5, such as a postcard, in the mail installation section 4 prepared in said input control unit 1, and keys the address information on a zip code or the destination read in mail 5 using the keyboard 6 similarly formed in the input control unit 1.

[0018] It conveys in the printing section which changes the address information which keyed into the mark in which machine reading is possible, for example, a bar code, by the microprocessor prepared in the interior of the input control unit 1, and mentions mail 5 later by printing directions actuation with said keyboard 6, a bar code prints to the position of mail 5 in this printing section using fluorescence ink, and the mail 5 which ended this printing keeps with said interim-storage stacker 2.

[0019] It sends out at a time one mail 5 which stored temporarily in said interim storage stacker 2 to the partition stacker section 3, and a bar code is read in mail 5 with the bar code reader 8 with which the partition stacker 3 was conveyed along the conveyance way 7, and formed mail 5 on the way. And it is made to contain the mail 5 conveyed based on the information, i.e., the address information, on the read bar code any of two or more partition stackers 9a, 9b, 9c, 9d, and 9e they are.

[0020] Drawing 2 is drawing having shown the internal configuration of coding equipment roughly, mail 5 is inserted into the belt 13 over which driving rollers 11 and 12 were built, and the belt 16 over which the follower rollers 14 and 15 were built at said input control unit 1, it is conveyed, and a bar code is printed by the ink jet printer unit 17 arranged to this middle. The mail 5 which was inserted into said belts 13 and 16 and was conveyed It continues. A belt 21 is minded [the belt 21 over which driving rollers 18, 19, and 20 were built, and / said / 18]. It conveys to said interim storage stacker 2 through the conveyance way which consists of a guide 24 counterposed to the counterposed follower roller 22, the follower roller 23 counterposed through the belt 21 to said driving roller 17, said driving roller 18, and the belt 21 between 19.

[0021] The mail 5 which the conservation stacker 2 contains mail 5 between the mail

electrode holder 25 and a belt 21, and has already been contained is lightly pushed on the belt 21 side with said mail electrode holder 25 by means of a spring (not shown), and the mail 5 which conveys between a belt 21 and guides 24 is inserted in a No. [1] before [the mail 5 contained] side temporarily [said]. If it gets mixed up as the drawing Nakaya mark shows, and the amount of the mail 5 to contain increases and rail 26 and 26 top is attained to the location of the conveyance belt 27 according to the amount of the mail 5 to contain, since this conveyance belt 27 will rotate said mail electrode holder 25 towards the drawing Nakaya mark, one mail 5 is inserted at a time with a driving roller 28 and the follower roller 29, and is sent out to said partition stacker section 3.

[0022] The decolorization machine 30 is formed in the location of the mail 5 contained to the conservation stacker 2 temporarily [said] which countered the near side most as a decolorization means. To the conservation stacker 2, this decolorization machine 30 is arranged movable forward and backward, irradiates a specific light and performs decolorization processing into the decolorization material contained in the ink of the bar code printed in said ink jet printer unit 17 temporarily [said].

[0023] With the belt 34 over which driving rollers 31, 32, and 33 were built, and the belt 38 over which the follower rollers 35, 36, and 37 were built, said partition stacker 3 forms a conveyance way, **** mail 5 inserted and sent out with said driving roller 28 and follower roller 29 by said belts 34 and 38, and conveys it. And it was located between said driving roller 31 and 32, and said bar code reader 8 is arranged. In addition, opposite arrangement of another follower roller 39 is carried out through a belt 38 at said follower roller 36, and the ups-and-downs section of a belt 38 is supported.

[0024] The mail 5 ****(ed) and conveyed by said belts 34 and 38 is ****(ed) and conveyed by said belts 42 and 45 of the conveyance way which consists of a belt 42 built by driving rollers 40 and 41 and a belt 45 over which the follower rollers 43 and 44 were built. Then, it **** and conveys by said belts 48 and 51 of the conveyance way which consists of a belt 48 over which driving rollers 46 and 47 were built, and a belt 51 over which the follower rollers 49 and 50 were built. Then, it **** and conveys by said belts 54 and 57 of the conveyance way which consists of a belt 54 over which driving rollers 52 and 53 were built, and a belt 57 over which the follower rollers 55 and 56 were built, and mail 5 is conveyed towards said each partition stackers 9a-9e in this way.

[0025] And when chosen during this conveyance as a result of [of a bar code] read (for example, partition stacker 9a), a selector 58 rotates and partition stacker 9a is made to contain mail 5. When partition stacker 9b is chosen, a selector 59 rotates and partition stacker 9b is made to contain mail 5. Each partition stackers 9a-9e are made to contain mail 5 alternatively based on the read result of a bar code as a selector 60 rotates and partition stacker 9c is made to contain mail 5, when partition stacker 9c is chosen.

[0026] Said ink jet printer unit 17 is what used the ink jet arm head 61 of a piezo method, as shown in drawing 3 , and this ink jet arm head 61 fixes and constitutes PZT70 which formed diaphragm 66 in the back end side, and formed the up electrode 67 and the lower electrode 68 in anchoring and the back end side of this diaphragm 66 while fixing the orifice plate 65 which established the ink delivery 64 in the apical surface of the substrate 63 in which the ink room 62 was formed. Said PZT70 and each electrodes 67 and 68 are contained in the head frame 71. The ink feed hopper 72 which was open for free passage in said ink room 62 is also formed in said substrate 63, and this ink feed hopper 72 is open for free passage to the ink supply unit (not shown) prepared outside.

[0027] PZT70 will carry out deformation actuation, diaphragm 66 will be changed by this deformation actuation, and said ink jet printer unit 17 will give pressure variation to the ink in the ink room 62, if a pulse voltage is impressed between the up electrode 67 and the lower electrode 68. By this pressure variation, the ink in the ink room 62 will breathe out from the ink delivery 64, and will print an ink dot.

[0028] The ink used for this printing is fluorescence ink, and when it dissolves in a solvent, the fluorescence material used for this fluorescence ink cannot appear [whether it can view and] easily, namely, is using the invisible material. Moreover, the decolorization material decolorized when the wavelength of specification [this fluorescence ink] is irradiated is mixed. The material which there is almost no absorption under the light, and is excited by ultraviolet radiation as a fluorescence material, and emits light in the light, for example, a fluorescent brightener, and ER-120, ER-122 (all are the Mitsui Toatsu Chemicals, Inc. make) and the general daylight fluorochrome of the concentration of the degree which is not colored -- further The fluorescence material of the type which is excited by infrared light and emits light in infrared radiation For example, the resin solid solution which mixed and created the fluorescence material, low-concentration cyanine dye, and low concentration cyanine dye by which activation was carried out with neodium ion or ITTERIBIUMU ion at the time of the emulsion polymerization of the copolymerization object of styrene acrylonitrile is usable. Moreover, decolorization coloring matter, such as cyanine dye, is used as a decolorization material.

[0029] When cyanine dye is used as a fluorescence material, a decolorization material uses the cyanine dye which shows absorption to long wave length rather than the wavelength excited with the cyanine dye of a fluorescence material. As a fluorescence material and a decolorization material, cyanine dye, NK-3377 [for example,], NK-3761, NK-3803, NK-4254, NK-4341, NK-3872 (all are Japanese sensitizing dye research institute company make), etc. are usable.

[0030] In mail 5, said ink jet printer unit 17 prints a bar code 73 on the right-hand side

of the destination, as shown in drawing 4 using such fluorescence ink. The bar code 73 printed here is a code of the three 4 State bar format, and this code is what used long bar 73a, left half bar 73b, right half bar 73c, and four kinds of shorting bar 73d bars, and it expresses a numeric character etc. with three bars in the combination of four kinds of this bar.

[0031] ER-120 are used as a fluorescence material. This fluorescence material is a material which generates the light near 615nm, when the ultraviolet radiation near 365nm is irradiated, as a luminescence property is shown in drawing 5. Moreover, there is no absorption wavelength of this fluorescence material in a visible region, as shown in drawing 6. That is, in a visible region, it is an invisible fluorescence material. Therefore, the ink which used this fluorescence material turns into whether it can view, unless ultraviolet radiation is irradiated, and ink which cannot appear easily. Moreover, as a decolorization material, NK-3761 of cyanine dye are used, for example.

[0032] ER-120 -- ethanol -- 1wt% -- the dissolved fluorescence solution is prepared. Although NK-3377 [water-soluble], NK-3761, NK-3803, NK-4254, NK-4341, and NK-3872 grade can be used as cyanine dye, NK-3761 which can be easily decolorized on specific wavelength are used here. The wetting agent of polyhydric alcohol is mixed with water for these NK-3761. As a wetting agent, it has by carrying out what mixed one kind, such as a glycerol, ethylene glycol, a diethylene glycol, triethylene glycol, a polyethylene glycol, propylene glycol, dipropylene glycol, and tripropylene glycol, or two kinds or more. Here, the diethylene glycol was used.

[0033] Moreover, as a surfactant, there are few cellular operations and the nonionic surfactant which is not influenced of ionicity is desirable. For example, the surfactant which added ethyleneoxide to the polypropylene glycol is usable. These were mixed and operation ink A, B, and C and comparison ink A and B were created as follows. In addition, 35 dyn/cm and a contact angle have [ink viscosity / 10cp(centipoise)**3 and surface tension] desirable about 25-50 degrees, and it was made for prototype ink here to become 12cps, 35 dyn/cm, and about 40 degrees of contact angles. Moreover, it controlled using the heater to be always able to control an ink jet arm head at 35 degrees C. Therefore, each prototype ink is made into the compounding ratio which can be satisfied with 35 degrees C of ink viscosity, surface tension, and a contact angle.

[0034]

Operation ink A Water : 30.35wt% Diethylene glycol : 57.00wt% Ethanol fluorescence solution : 8.00wt% (ER-120:0.08wt%)

Cyanine dye : 0.05wt% Water soluble resin : 3.00wt% Surfactant : 1.00wt% Defoaming agent : 0.10wt% In addition to this : 0.50wt% operation ink B Water : 30.375wt% Diethylene glycol : 57.00wt% Ethanol fluorescence solution : 8.00wt% (ER-120:0.08wt%)

Cyanine dye : 0.025wt% Water soluble resin : 3.00wt% Surfactant : 1.00wt% Defoaming agent : 0.10wt% In addition to this : 0.50wt% operation ink C Water : 30.75wt% Diethylene glycol : 56.64wt% Ethanol fluorescence solution : 8.00wt% (ER-120:0.08wt%) Cyanine dye : 0.01wt% Water soluble resin : 3.00wt% Surfactant : 1.00wt% Defoaming agent : 0.10wt% In addition to this : 0.50wt% comparison ink A Water : 30.85wt% Diethylene glycol : 56.55wt% Ethanol fluorescence solution : 8.00wt% (ER-120:0.08wt%) Cyanine dye : 0.00wt% Water soluble resin : 3.00wt% Surfactant : 1.00wt% Defoaming agent : 0.10wt% In addition to this : 0.50wt% comparison ink B Water : 30.30wt% Diethylene glycol : 57.00wt% Ethanol fluorescence solution : 8.00wt% (ER-120:0.08wt%) cyanine-dye : Operation ink D and comparison ink C were created instead of ER-120 as a 0.50wt% and fluorescence material using the fluorescent brightener. : 0.10wt% Water soluble resin : 3.00wt% Surfactant : 1.00wt% Defoaming agent : 0.10wt% In addition to this

[0035] Operation ink D water : 36.365wt% diethylene glycol : 58.00wt% cyanine dye : 0.025wt% fluorescent brightener : 1.00wt%, other fluorochromes : 0.01wt% water soluble resin : 3.00wt% surfactant : 1.00wt% defoaming agent : 0.10wt% others : 0.50wt% comparison ink C water : 36.375wt% diethylene glycol : 58.00wt% cyanine dye : 0.025wt% fluorescent brightener : 1.00wt% water soluble resin : 3.00wt% surfactant : 1.00wt% defoaming agent : 0.10wt% others : The other fluorochromes which are 0.50wt% and which were used in operation ink D By the fluorochrome used in order to distinguish from the fluorescent brightener contained in paper, a material with luminescence wavelength longer than a fluorescent brightener is used, mixing one kind or more than it. As this fluorochrome, there are Brill.Flavine 10GFH300% [by the Hodogaya chemistry company], Yellow 7GLH, and Yellow 3GLH 200%, Flavine 10 G-DP, Yellow 7 G-DP, Kyafect Yellow G by Nippon Kayaku Co., Ltd., other makers' fluorescence material, etc., for example as a material in which the wavelength of a yellow system is shown. Moreover, as a material in which the wavelength of a red system is shown, there are colors, such as Cathilon Brilliant Pink CD-BH by the Hodogaya chemistry company and KSTMagenta J-FB (JFB is called hereafter.).

[0036] In addition, of course, it is not what is limited to these. JFB was used in the above-mentioned operation ink D. Since JFB does not become invisible in high concentration, or ink which cannot appear easily, it is used in the very thin condition. 0. It becomes invisible or ink which cannot appear easily by making it less than [01wt%].

[0037] Moreover, as a fluorescent brightener used in operation ink D and comparison ink C, Mikephor BS conc. etc. is usable (BS is called the Mitsui Toatsu Chemicals, Inc. make and the following.), and used this BS here, for example. Moreover, although it is better to add in order to fix a fluorescence material good and to make it a radiant power

output stabilized, since the water soluble resin currently used in each ink causes blinding of an arm head, it adds the minimum amount. As water soluble resin, polyvinyl alcohol, a polyvinyl pyrrolidone, acrylic resin, styrene maleic resin, mallein-ized polybutadiene, mallein-ized alkyd resin, acrylic denaturation shellac resin, etc. can be used, for example.

[0038] Using said each operation ink A-D and each comparison ink A-C, in mail 5, as shown in drawing 4 , the bar code 73 was printed, and the read engine performance, decolorization time amount, the visibility before decolorization, and the visibility after decolorization were evaluated, respectively. In operation ink D, JFB is used as a fluorochrome, BS is used as a fluorescent brightener, and the luminescence wavelength when mixing these and glaring with UV lamp is shown in drawing 7 . In addition, the portion of the slash in drawing shows the field which contributes to a radiant power output.

[0039] Moreover, if the absorption wavelength of NK-3761 of cyanine dye has a peak near 780nm as shown in drawing 8 , and this wavelength is irradiated, as shown in drawing 9 , it will be decolorized. the graph with which this drawing 9 shows the relation between cyanine dye concentration and a discharge -- it is -- graph g1 The Macbeth concentration change to the time amount when mixing is shown. cyanine dye -- 0.1wt(s)% -- graph g2 The Macbeth concentration change to the time amount when mixing is shown. cyanine dye -- 0.05wt(s)% -- graph g3 cyanine dye -- 0.025wt(s)% -- the Macbeth concentration change to the time amount when mixing -- being shown -- graph g4 cyanine dye -- 0.01wt(s)% -- the Macbeth concentration change to the time amount when mixing is shown.

[0040] An evaluation result is shown in a table 1.

[A table 1]

[0041] Said bar code reader 8 performs a read performance evaluation, and this reader 8 arranges the UV lamps (black lamp) 85 and 86 on both sides of a lens 82 while

arranging a lens 82, a filter 83, and CCD camera 84 in the center section of the reading aperture 81, as shown in drawing 10 , it processes the signal from said CCD camera 84 in the detector section 87, and detects the existence of a bar code.

[0042] This bar code reader 8 irradiates the ultraviolet radiation whose peak wavelength is 365nm from the UV lamps 85 and 86 to mail 5. The portion printed in the fluorescence ink on mail 5 by the exposure of this ultraviolet radiation emits light on wavelength different from the irradiated ultraviolet radiation. This light that emitted light passes a lens 82 and a filter 83, and is condensed by CCD camera 84. Said filter 83 is a filter of Y52 (Hoya Corp. make) which passes the wavelength of 520nm or more as shown in drawing 11 , arranges this filter 83 just before CCD camera 84, and cuts the light from the fluorescent brightener on mail 5.

[0043] As a read result was shown in a table 1, except for comparison ink C, as for all other ink, read was performed good. Since comparison ink C used only the fluorescent brightener as a fluorescence material, the read of it became improper. As a fluorescence material from this result, ER-120 or JFB is enough. This fluorescence material becomes invisible ink which emits light efficiently and cannot be visible to a long wavelength side easily in the ability not to view moreover from a fluorescent brightener.

[0044] Moreover, it is necessary to enable it to check by looking in the visibility of the ink before decolorization until postal district part processing is completed. NK-3761 of cyanine dye are presenting green in ink. Except for comparison ink A, other ink of the visibility of the ink before decolorization was good. Since cyanine dye is not contained in ink, ink serves as only a fluorescence material, comparison ink A turns into invisible ink, and the check by looking of it becomes impossible. on the other hand, cyanine dye -- more than 0.01wt% -- if it adds, the check by looking of the printed bar code will be attained easily.

[0045] From the above thing, a check by looking will be possible before decolorization, and it will be called operation ink A-D and comparison ink B as fluorescence ink in which read is possible. However, if the bar code remains on mail 5, since the case where a recipient senses unpleasant will arise, it is necessary to return to whether fluorescence ink cannot be decolorized and it can view and the invisible fluorescence ink which cannot appear easily. On the other hand, processing of mail 5 has dispatching *****, a route assembly partition, etc. Therefore, it is desirable to perform the discharge of fluorescence ink during the phase which all partition business ended, i.e., the phase which the route assembly partition ended, and a route assembly partition. The mail 5 which performs a route assembly has some by which the bar code is already printed, and if this thing is before decolorization, it can check a bar code easily.

[0046] Therefore, the mail 5 which bar code printing has already ended classifies by

performing decolorization processing. When the bar code is not printed, after printing, it decolorizes and classifies. The decolorization machine 30 arranged in the location of the interim storage stacker 2 performs this decolorization processing. Said decolorization machine 30 fixed the halogen lamp 92 with the fixture 91, as shown in drawing 12 , and it arranges the filter 93 just before this halogen lamp 92. This decolorization machine 30 also becomes a fixture at the time of making mail 5 discharge from the conservation stacker 2 temporarily.

[0047] Since the luminescence property of said halogen lamp 92 has the peak 780nm near the wavelength which is the absorption wavelength of cyanine dye as shown in drawing 13 , it can decolorize cyanine dye efficiently. Moreover, light is irradiated through a filter 93 so that the fluorescence material which irradiates ultraviolet radiation and emits light may not be affected. Said filter 93 is a filter which passes the wavelength of 560nm or more as shown in drawing 14 . In addition, what is necessary is just the filter which cuts the wavelength which a fluorescence material absorbs as this filter, and penetrates near the absorption wavelength of 780nm of cyanine dye.

[0048] Thus, ink is decolorized by irradiating the light from the halogen lamp 92 of the decolorization machine 30 on the bar code of mail 5 through a filter 93. In addition, it depends for a decolorization property on the concentration of cyanine dye, and the exposure time of a halogen lamp 92. That is, a discharge will take time amount to the early Macbeth concentration greatly (the larger one has a deep color), so that the concentration of cyanine dye is high, as shown in drawing 9 . With [after being decolorized / in the Macbeth concentration] 0.05 [or less], it will be in the condition that it can hardly distinguish with the substrate of mail 5. cyanine dye -- 0.1wt(s)% -- the case of mixed comparison ink B -- graph g1 Even if it performs decolorization processing so that it may be shown, it will not be able to decolorize within in 60 seconds, but the bar code colored yellow from green after decolorization will be able to be checked by looking. That is, in a read result or the visibility before decolorization, although comparison ink B was good, it was a defect (x) about the visibility after decolorization.

[0049] In addition, although, as for the defect (x), the visibility after decolorization carried out decolorization processing with the decolorization vessel 30 in a table 1, the condition that sufficient discharge is not made but viewing is possible is said. On the contrary, as for fitness (O), the visibility after decolorization can do a discharge certainly with the decolorization vessel 30, and it is shown whether it can view and that are hard to be visible, namely, it became invisible ink. Less than [0.025wt%] which less than [0.05wt%] is desirable as for cyanine dye concentration, and can be decolorized within 10 more seconds from the above result is desirable.

[0050] Thus, in the coding equipment of the gestalt of this operation, by an operator's

reading address information in mail 5, and keying from a keyboard 6, and making mail 5 convey, input is changed into a bar code and a bar code is printed in mail 5 using fluorescence ink as shown in operation ink A-D mentioned above when mail 5 arrived at the location of the ink jet printer unit 17. After the mail 5 with which the bar code was printed is conveyed further and stored temporarily by the interim storage stacker 2, based on the information, i.e., the address information, on the bar code which it was conveyed by the partition stacker section 3, and the bar code printed in mail 5 was read with the bar code reader 8, and was read, mail 5 can distribute to either of the partition stackers 9a-9e, and is contained. Thus, a bar code can be read in the mail 5 which printed the bar code, an automatic partition can be carried out at the partition stackers 9a-9e, and workability can be improved.

[0051] Moreover, in a decolorization process, the modes differ by the mail 5 with which the bar code was already printed, and the mail 5 by which the bar code is not printed. When printed, it is omitted like the input of address information, and the print line of a bar code, and can distribute to the segmentum-posterior part stackers 9a-9e to which the discharge of fluorescence ink was performed with the decolorization vessel 30. Moreover, when not printed, after carrying out like the input of address information, and the print line of a bar code, the discharge of fluorescence ink is performed by the decolorization machine 30, and it can distribute to the partition stackers 9a-9e.

[0052] Thus, by printing a bar code in mail 5 using invisible fluorescence ink as shown in operation ink A-D, since it is in the condition of being visible before performing decolorization processing, the check of whether the bar code is printed by mail 5 can be performed easily, and an operator does not print a bar code in mail 5 accidentally at a duplex. Moreover, since a discharge can do this invisible fluorescence ink simply using the decolorization machine 30, when returning to original invisible fluorescence ink and reaching the recipient of mail after performing decolorization processing, since it has been hard coming to be visible, displeasure is not given [that the bar code of mail cannot be viewed, or] to a recipient.

[0053] In addition, it is also possible not to necessarily limit to this, although the gestalt of this operation describes the case where cyanine system coloring matter is used as a decolorization material, and to use the decolorization material in which the discharge according [for example,] to heat is possible. Moreover, in the case of the ink in which a fluorescence material consists of a fluorescent brightener with the gestalt of this operation, the read of a bar code was impossible, but since the read of it becomes possible by the case where the fluorescent brightener is contained on the surface of mail when this is the mail with which the fluorescent brightener is not contained, this kind of ink can also be used.

[0054] Moreover, with the gestalt of this operation, although the fluorescence material excited by UV (ultraviolet) light as a fluorescence material is used, it may not necessarily limit to this, and the fluorescence material excited by long wave length rather than the wavelength which a decolorization material decolorizes may be used. What is necessary is just to use the filter of a decolorization machine as a filter which does not excite a fluorescence material at this time. Moreover, the cyanine dye same as a fluorescence material and a decolorization material can also be used.

[0055] In addition, you may be coding equipment which does not necessarily limit to this although the coding equipment printed in mail with the gestalt of this operation is described, and is printed in addition to mail. Moreover, although the bar code was described as a mark which is printed with the gestalt of this operation and in which machine read is possible, of course, it is not necessarily what is limited to this. Furthermore, with the gestalt of this operation, although address information was inputted using the keyboard, it does not necessarily limit to this, and from mail, a zip code and the destination may be read optically and may be inputted automatically.

[0056]

[Effect of the Invention] As mentioned above, according to invention claim 1 and given in two, the printed result can be viewed easily and viewing of a printing result being impossible or the invisible fluorescence ink which it can be made hard to be visible can be offered by performing decolorization processing after that.

[0057] Moreover, according to invention according to claim 3 to 6, the printed result can be viewed easily and viewing of a printing result being impossible or the coding equipment which can perform easily the check of whether the mark in which machine read is possible can be printed in mail etc. using the invisible fluorescence ink which it can be made hard to be visible, and the mark is printed by mail etc. by this can be offered by performing decolorization processing after that.

[0058] Moreover, according to invention according to claim 6, the fluorescence ink used for printing is decolorized further, and invisible or the coding equipment which reads the mark which could make it hard to be visible and was printed, can carry out the automatic partition of the mail etc., and can improve workability can be offered.

[Brief Description of the Drawings]

[Drawing 1] The external view of the whole coding equipment in which the gestalt of operation of this invention is shown.

[Drawing 2] Drawing having shown roughly the internal configuration of the coding equipment in the gestalt of this operation.

[Drawing 3] The fragmentary sectional view showing the configuration of the ink jet

arm head used with the gestalt of this operation.

[Drawing 4] Drawing showing the mail which printed the bar code in the gestalt of this operation.

[Drawing 5] Drawing showing the luminescence property of the fluorescence material used with the gestalt of this operation.

[Drawing 6] Drawing showing the excitation property of the fluorescence material used with the gestalt of this operation.

[Drawing 7] Drawing showing the luminescence property of the fluorochrome used in the operation ink D in the gestalt of this operation.

[Drawing 8] Drawing showing the absorption property of the cyanine dye used with the gestalt of this operation.

[Drawing 9] The graph which shows the relation of the cyanine dye concentration and the discharge which were used with the gestalt of this operation.

[Drawing 10] The outline block diagram of the bar code reader used with the gestalt of this operation.

[Drawing 11] Drawing showing the property of the filter used with the bar code reader of drawing 10 .

[Drawing 12] The cross section showing the configuration of the decolorization machine used with the gestalt of this operation.

[Drawing 13] Drawing showing the luminescence property of the halogen lamp used with the decolorization vessel of drawing 12 .

[Drawing 14] Drawing showing the property of the filter used with the decolorization vessel of drawing 12 .

[Description of Notations]

5 -- Mail

6 -- Keyboard

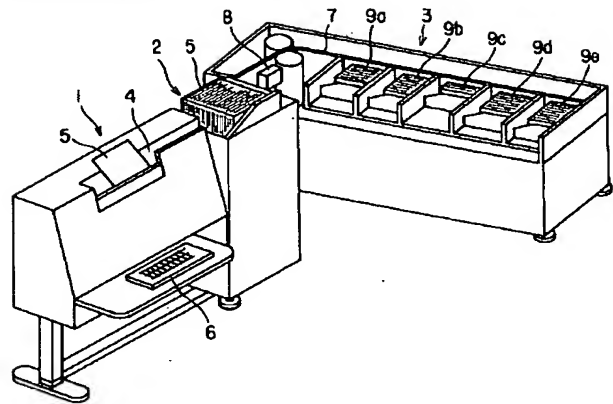
8 -- Bar code reader

9a-9e -- Partition stacker

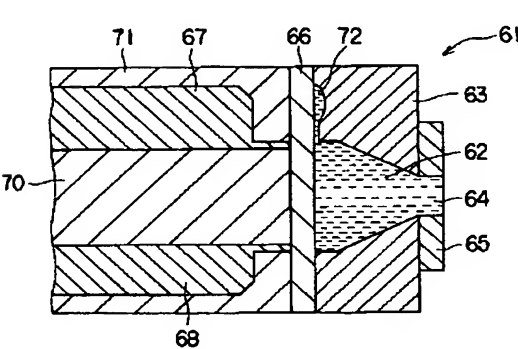
17 -- Ink jet printer unit

30 -- Decolorization machine

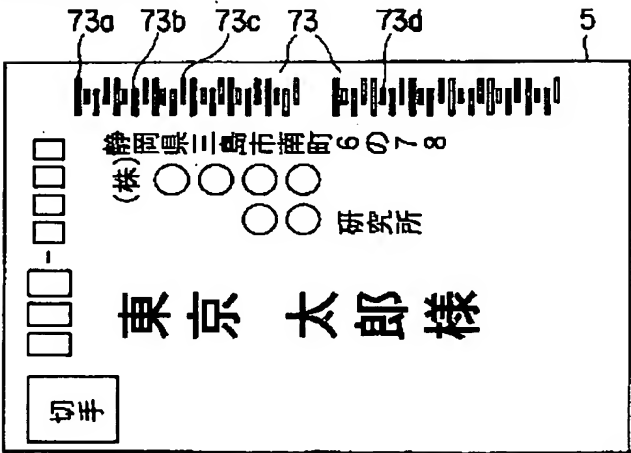
[Drawing 1]



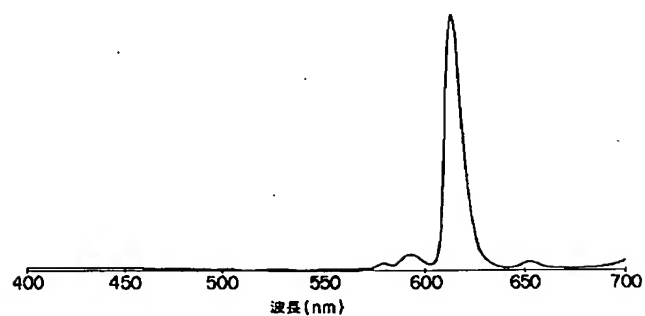
[Drawing 3]



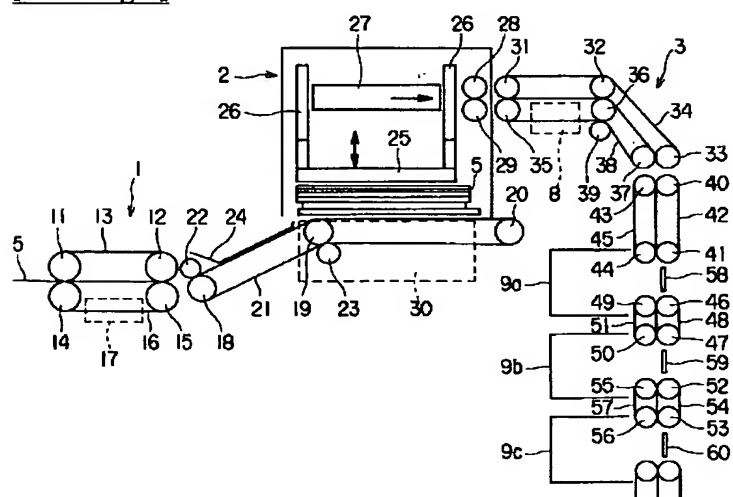
[Drawing 4]



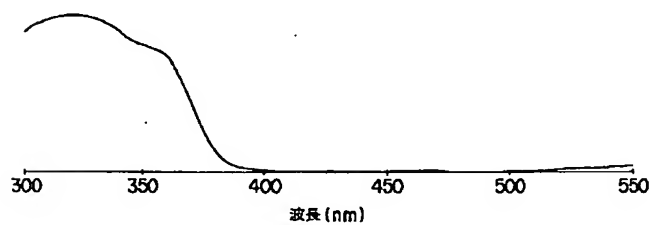
[Drawing 5]



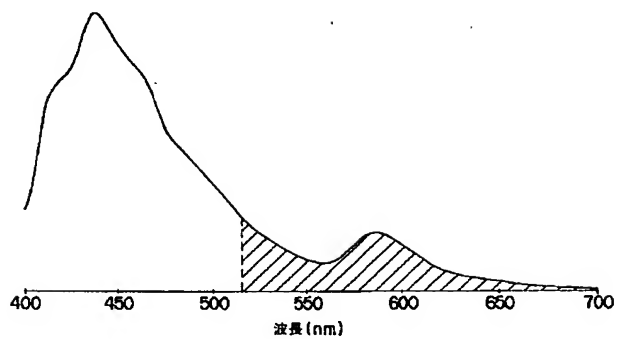
[Drawing 2]



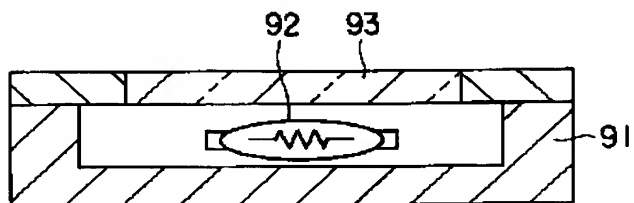
[Drawing 6]



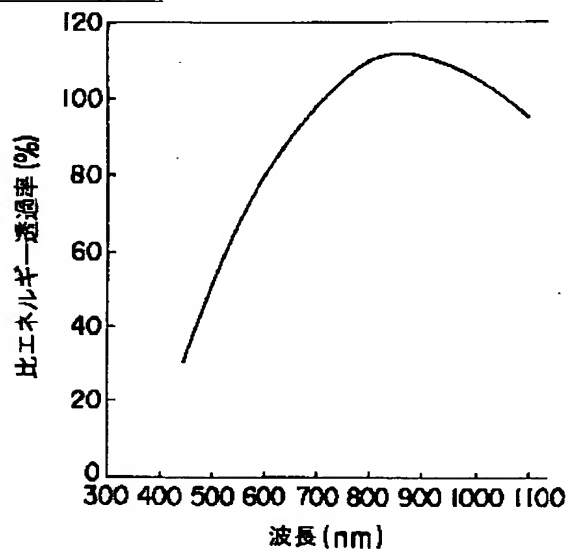
[Drawing 7]



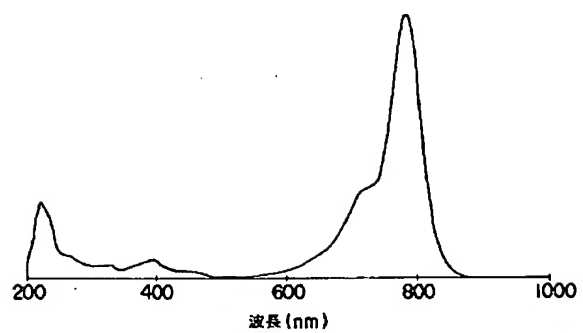
[Drawing 12]



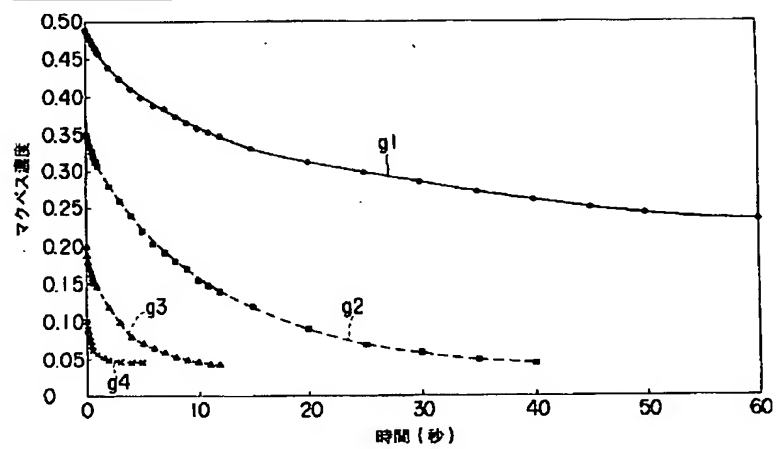
[Drawing 13]



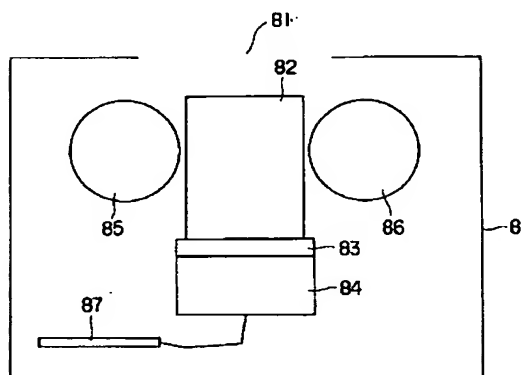
[Drawing 8]



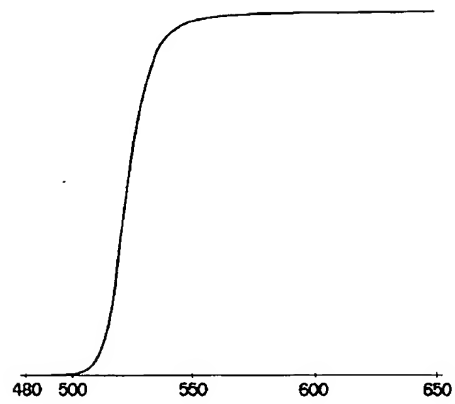
[Drawing 9]



[Drawing 10]



[Drawing 11]



[Drawing 14]

